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# SCIENCE NEWS-LETTER

*The Weekly Summary of Current Science*

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## TREES THAT SAW THE FIRST CHRISTMAS

*Magi of the West, Bearing Myrrh and Frankincense*

(*See page 379*)

*Vol. XVI* *No. 454*

# Graf Zeppelin to Make Soundings of Arctic Ocean and Air

*Aviation—Physical Geography*

SOUNDINGS of the water below and the air above with automatic radio-equipped balloons will be part of the program of scientific observations to be made by the *Graf Zeppelin* when it flies over the North Polar regions next spring. The flight is to be made under the auspices of the International Society for Arctic Research by Aircraft, generally known as Aeroarctic.

Dr. Walter Bleistein, treasurer of Aeroarctic and secretary of its technical commission, recently left Washington to return to Germany. While in the United States he organized American cooperation. Dr. J. A. Fleming, acting director of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington is secretary of the American section of the society.

The first ocean soundings from a dirigible will be made as the *Graf* sails over open lanes in the ice, Dr. Bleistein told Science Service. This will be done with the sonic depth finder, which measures the time taken for a sound to reach the bottom of the ocean and be reflected back to a microphone that is part of the apparatus. The airship will not alight, but will lower the instruments on the end of a cable to the water surface. Electrical connections between airship and the float carrying them will reveal the water depth at any point. While the soundings are being made the Zeppelin will be navigated to follow the lane.

Aerial study will be made by sending up small balloons, equipped with instruments for measuring atmospheric pressure, temperature and humidity. When such balloons are sent up from places in populated regions, the instruments are made to record the data. Usually they are found and returned to their source. As the Eskimos cannot be depended on to return the balloons, this method cannot be used, so the balloons will be equipped with small radio transmitters. They will automatically radio their observations back to the airship.

According to present plans, the expedition will start on April 1 from Tromsö, Norway, the European base, and is expected to take a total of six weeks. After a preliminary flight to Spitsbergen, to acquaint the scientific staff with life on an airship, the first long flight will be made, skirting Spitsbergen on the southwest, across the Arctic Ocean between Greenland and the pole to Beaufort Sea, thence across Alaska to Fairbanks, where a mooring mast and full equipment for handling an airship will be ready. A mooring mast is also provided at Tromsö.

The next flight will be over the great unexplored area between Alaska and the pole; from Fairbanks northwest, across Wrangell Island, then north to within 200 miles of the pole, and back to Alaska, paralleling part of the first flight. The third flight will be to return to Tromsö by way of Northern Land and Franz Josef Land. As Northern Land represents a large unexplored area, the ship will cruise around over it. If feasible, a party will be landed with sledges and equipment and left to return to civilization over the ice.

In addition to the upper air observations and the oceanographic research, investigations will be made on the electricity of the atmosphere, on the magnetism of the earth, and in meteorology.

Dr. Fridtjof Nansen, veteran Arctic explorer, will be the head of the expedition, while Dr. Harald U. Sverdrup will be second. Capt. E. A. Lehmann, who took the *Graf Zeppelin* back to Germany after its visit to America, will command the ship. The scientific staff will number 12, while a crew of 35 will be carried. As in former trips, the engines of the ship will burn gas, a supply of which is being provided at Tromsö and Fairbanks. This gas consists largely of ethane and propane, two compounds of hydrogen and carbon.

The expedition is really a reconnaissance one, Dr. Bleistein emphasized. It will determine the feasibility of exploration by airship and of landing parties on the ice. Should it prove successful, it will doubtless be the forerunner of future Arctic flights on still larger airships, thus exploring thoroughly all the Arctic regions in a far more complete manner than is possible on the ground.

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## Mexico's Name

*Archæology—Etymology*

That the name "Mexico" comes from "mexictli," the Aztec word for the native maguey or pulque plant, is the conclusion of Enrique Juan Palacios, of the Mexican Direction of Archaeology, who has searched for its origin in native Indian documents, as well as in other sources of information.

Every Mexican school-child knows that his national coat-of-arms is but a modern adaptation of the ancient Aztec hieroglyph or place-name for "Tenochtitlán," as pre-Conquest Mexico City was called. Mexico's shield, therefore, is at least six centuries old.

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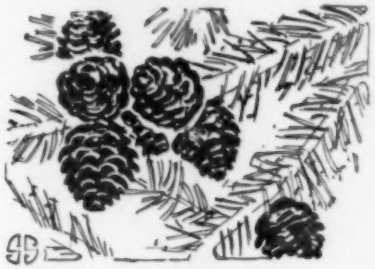
# You May Enjoy Your Christmas Tree

## Forests Not Hurt by Proper Cutting



THE use of Christmas trees, once decried by conservationists, is now approved by the U. S. Forest Service. A considerable part of the little trees that come to the market represent thinnings from public and privately owned forest lands. The normal course of events in a re-seeded forest area after lumbering or a fire brings about severe overcrowding and an intense competition among the young trees for a place in the sun. A great majority of the saplings are destined to lose out in the struggle, but if left to settle the contest among themselves the survivors are apt to be too slim and "weedy" to make good logs. Therefore thinning is resorted to, and the Christmas tree market provides a use for the trees that would otherwise have to be burned, and at the same time helps to defray the cost of cutting.

Another commercial source of Christmas trees that is growing in importance is the Christmas tree nursery, in which fine specimens of young spruces and firs are grown especially for the Christmas trade. Some of these trees are cut and sold in the usual way, and others are transplanted into tubs to serve as permanent Christmas trees. The purchasers move the tree out of the house after the holiday season and set the tub in a hole in the ground, where it serves as a part of the lawn shrubbery until another Christmas comes around. This eliminates the bother of shopping for a tree every year, and since the tree does not dry out in the house it does not litter the place up with dead needles as badly as ordinary Christmas trees usually do.

### *Many Kinds Offered*

The most popular of Christmas trees, and the kind most abundantly supplied from thinnings in commercial forests, is the spruce. This is one of the most abundant of evergreens, found clear around the world wherever snows lie long in winter, and extending far southward along mountain ranges. It is the commonest of the high-altitude conifers, for example, in the southern Appalachians. There are many species, but they are all recognizable by their four-sided, stiff, short, prickly leaves, and by their thin-scaled cones hanging downward on the twigs.

An even finer Christmas tree, though less abundant in this country, is the fir. The fir is the "Tannenbaum" of which the German children sing; it is the original Christmas tree, and was used at pagan Teutonic and Celtic midwinter festivals before the coming of Christianity to northern and western Europe. Its leaves are a little longer than those of the spruce, flatter in shape and usually curved, less stiff and quite without the prickliness of the spruce needles. Its cones are thin-scaled like those of the fir, but stand erect instead of hanging down. Most of the firs contain a good deal of gummy resin, which makes them rather sticky to handle and in some places has given the tree the name of "balsam."

In the Pacific Northwest, where the Douglas fir grows, little trees of this species are sometimes used at Christmas. It is not a fir in the strict sense; neither is it a spruce. It is intermediate between these two trees in the character of its foliage, but it can be distinguished easily by its cones. These hang downward, as do those of the spruce, but over each scale there projects a three-pronged appendage, which is lacking in both firs and spruces.

Pines are less used for Christmas trees, except in the seaboard regions of the Southeast and to a certain extent in the Middle Atlantic States. Here the pine barrens and the neglected clay soils produce a scrubby growth of pines of little value as timber, and these supply a large quantity of satisfactory Christmas trees in the lower price brackets.

### *"Slow on the Greens"*

Go slow on Christmas greens; there aren't any more where they came from. Almost all of the holly, ground pine, laurel and other Christmas greenery found in the market is gathered from the wild, and the demand is eating up the available stocks far more rapidly than natural growth is replacing them.

This is especially true in the case of holly and ground pine. Holly is a hard-wooded, slow-growing shrub or small tree that thrives in the South and along the eastern seaboard as far north as Massachusetts. One year's unrestricted cuttings destroys the growth of ten or a dozen years, and at this rate it will not be long until the native supply of holly will have vanished completely.

Americans are already importing European holly partly because of the increasing scarcity of our own species, though because it is a brighter and showier plant, with glossier leaves and more and larger berries. Here is a case where we need not be ashamed to admit the superiority of a foreign product, if it will result in the protection and preservation of a native wild plant.

Ground pine is the fine prickly green stuff that forms the basis of most Christmas garlands and wreaths. It is not a pine, but a relative of the ferns. Unlike holly, it has as yet never been successfully cultivated, although many attempts have been made. It is very widely distributed, but unfortunately it is even more slow about renewing its growth than holly, and once it is stripped from a given piece of ground it does not come back for many years if at all.

*Science News-Letter, December 21, 1929*

A bread kneader from Egypt. One of the earliest movable toys known, believed to date back to 2000 B. C.

# Ancient Dolls and Toys Tell Whole History of Race

*Archæology*

**By Marjorie MacDill**

*Dear Santy:*

*I am seven yeres old and have been a good boy all yere, exsept once or twice, and I want you to bring me an electric train for Christmas and a toy airplane and a motor boat that reely runs in the water and a motor for my mecchano set and a trycicle. My sister Betty Jane is four and can't write yet. She wants a doll carriage and a doll house.*

*Yours truly,*

*Richard James Howard, Jr.*

*P. S. we live at 65 Charles St., Warrenford, Ohio, in the brick house on the corner with two chimnies.*

Grubby pencils by the thousand are being grasped in grimy fingers in the laborious effort to set forth painful epistles similar in content to the above. For in spite of the blasé veneer of even the youngest generation, about this time of year it is tacitly conceded to be politic not to express too great a disbelief in jolly old Saint Nick.

These childish lists of things hoped for on Christmas Day in the morning contain a lot of unsuspected psychology, and in a way epitomize the whole of human history as well. All through the ages, Richard Junior has shown himself the father of the Richard Senior who is to be: his masculine mind demands the new, the creative, the latest evidence of mechanical advance. But Betty Jane, from Chaldea and Egypt down to New York and Paris, has always wanted the same toys—dolls. She is the maternal, the careful, the conservator of that which will be "good for the children."

Dr. Karl Groeber of Dresden has made a long study of the history of toys as they portray the minds of children through the ages. He has been thoroughly German in his painstaking exhaustiveness, thoroughly German also in his quick and sympathetic appreciation of the feelings and desires of "die Kinder."

And he says that from prehistoric times down to the present, a little girl's play interests always have kept to one orbit. Her mother's round of household duties is the model for her play until the end of childhood. Her doll's dress may reflect the change of time in crinoline, stiff brocade or Scotch kilts. Her doll's house may have four-post beds or old-time cradles, but the idea underlying the little girl's paraphernalia of playthings remains the same.

But the range of desires in the boy changes often. The creative instinct is more strongly developed in him. The world of affairs his father lives in is reflected in his little cosmos very early, declares Dr. Groeber. Consequently modern toys of boys past infancy bear little resemblance to those that fell into the moat from medieval courtyards or cluttered up odd corners in the marble villas of ancient Rome. To the youngster of today a Trojan horse or a knight in armor wouldn't mean a thing. He is interested primarily in airplanes, automobiles, speedboats and steam engines—things that copy the latest creations of the grown-up mind. For this reason a survey of toy history throughout the ages gives a picture of human development in miniature.

The toys of very young babies are always fundamentally the same, the German scientist points out. It makes no difference whether we search in ancient Egypt and Persia or in modern Lapland or Fiji, or even in our own toyshops. The very earliest specimens that the museums of the world can show us are rather strikingly similar to the first toys we give to Baby nowadays. The wooden crocodile with a movable jaw that delighted some Egyptian tot three thousand years ago is not so very different from the painted arts-and-crafts toys dispensed from exclusive shops today.

Models for the simple toys of very little children have been based on much the same type of model taken from the immediate environment. Since the older civilization flourished in the warm climates around the eastern end of the Mediterranean, we find in their ruins toys modelled on the characteristic creatures of those southern lands, such as the crocodile and the tiger. The children of the plains Indians of our own West made crude little figures of prairie animals like the bison and the pronghorn antelope.

Wood, being light, unlikely to break, and easy to work, has been a favorite material for toys from time immemorial. Since it is also perishable, comparatively few ancient wooden toys have come down to us. Most of the ancient toys that have survived are of clay. Many of them are little things like clappers, rattles, little pots and, of course, miniature figures of animals. The first dolls

must have been primitive affairs of wood decked with bits of cloth and beads.

The dry soil and climate of the Nile valley have preserved much of what is known of ancient Egyptian history. So many small figures of slaves and attendants were placed in graves to attend gentlefolk after death that it is difficult for archaeologists to distinguish objects of this class from those that were really toys. Among the oldest of the "sure enough" toys that have been found are the little movable figures of the wooden bread kneader and crocodile. There is also a tiger in one of the Old World museums that waggles a bloodthirsty wooden jaw with a string mechanism.

Graves of the sixth and seventh century A. D., opened at Akhamin Panopolis, have yielded a veritable treasure trove of indisputable children's toys. Some of the very earliest dolls known, made of wood with painted heads and hair of crocheted yarn, came to light here. That stock nursery property, a horse on wheels dragged about by a string, also dates from this period. The specimens found differ very little, in the estimation of Dr. Groeber, from those made and sold by the Berchtesgaden wood carvers of Germany a thousand years later.

In the year 1100 B. C. the foundation stone of a temple was laid in Susa, Persia. Onlookers threw in pious offerings of their most prized possessions. Centuries later, when this cite was excavated by archaeologists, among the offerings found were two little animals made of white sandstone. One was a lion and the other was an indeterminate sort of creature that might have been either a pig or porcupine. Both were on little wheeled stands, with a hole through one end for a string. From Babylon the solitary find of this sort is an alabaster doll with movable arms. Recent excavations at Kish have brought to light a toy chariot with six horses that must have made some young men of five thousand years ago wild with joy.

Toy remains from the glory and grandeur of Greece and Rome are all too few. The literature of the period has few references to toys, but Greek vases showing children's scenes give some idea of how the youngsters played. For one thing, they had clappers or rattles. Anchyras, the mathematician and soldier, is said to have perfected a toy of this type. The young Greeks had two-wheeled carts with a long pole and crossbar for a handle. This species of classical express wagon, we know from a chance reference in one of Aristophanes' comedies, cost an obulus apiece, or about three cents, in the Athens market. We also know that the boys had toy soldiers of wood which were kept inside hollow Trojan horses, faithful to the best classical tradition of the fall of Troy. According to later reports, wooden horses were made and sold in the neighborhood of the Trojan ruins along with regiments of little soldiers to fill them.

The only Greek and Roman dolls that have survived are of clay with arms and legs fastened to the trunk with strings. There are also a few small pieces of bronze furniture. From references in classical literature we know that a Roman girl on her wedding morning sacrificed her dolls to the goddess of marriage.

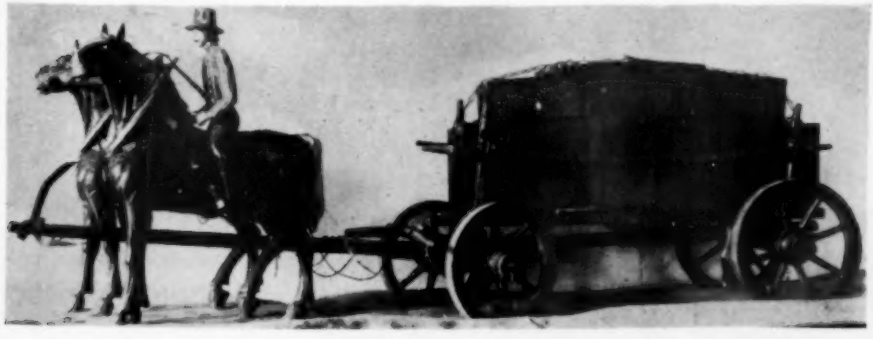
Even less is known about the toys of the children of the early middle ages than of those of antiquity. The primitive standard of living and total absence of comfort of that rough era probably did not foster any very elaborate amusements for the offspring of even the nobility. Children were not considered important, so they are seldom mentioned, and, aside from representations of the Christ Child, not often pictured. There are a few clay dolls, horses and armored knights. In one collection of Europe is a tiny lady on a palfrey with a falcon on her wrist.

One of the most interesting relics of the Middle Ages comes from France. On the bridges over the Seine during medieval times were little booths and stalls at which figures of the saints and little knicknacks of tin and lead were offered for sale to passers-by. Whether one of these shops was destroyed or whether it had a more than usually wide crack in the floor will never be known, but when recent dredging operations were under way in the Seine several of these little lead and tin figures were found. Among them was a little tin knight in armor that can be fairly classed as the forerunner of all the legions of tin soldiers that saw the light of day in the nineteenth century. The tiny tin knight is unmistakably a real tin soldier, with a base to hold him upright just like those attached to the feet of the tin armies procurable on the ten-cent store counter today.

Brass horses we learn about from a North German saga, which tells of a youth of six who lends his four-year-old friend his brazen steed to play with.

Though no dolls of the fifteenth century have survived that can be dated definitely, there is evidence that there were hand workers of Nuremberg at this period who made the production of dolls their principal business. About other kinds of playthings at this time there is no information in any book or picture, save here and there a little windmill or hobby horse in the hands of the Christ Child or his small friends in some church painting of the Holy Family. Several gorgeous figures of miniature knights have been preserved, however, from late medieval times.

If it were not for the woodcut of the games of the young Kaiser Maximilian I, made by Burgkmair in 1516, they might have been regarded simply as models of tilting armor. This picture shows that these elaborately accoutred figures were used in a tilting game on a table. They were placed opposite each other with lances crouched. Then each child pushed his knight against that of the other, trying to strike (*Turn to page* 390)



*Courtesy of Museum of Gg. Lang s. Erben,Oberammeyau.*

**Horses and wagon made by the famous toy makers of Oberammergan. Forerunner of the miniature "Graf Zeppelins" of today.**

Dr. A. F. Blakeslee and Dr. Sophia Satin, of the Carnegie Institution's Department of Genetics, examine their exhibit of work on bread-molds, proving that these lowly organisms show sex differences.

# Three or Four Breaths a Minute

## Physiology and Astronomy in Carnegie Exhibits

*General Science*

A PHYSIOLOGICAL celebrity, a young woman physiologist who breathes only three to five times a minute, was the object of great scientific interest and public curiosity during the Carnegie Institution of Washington's annual exhibition of scientific work.

The average adult breathes fifteen to eighteen times a minute, and the extremely slow normal breathing of the young woman, now an assistant in physiology in Goucher College, Baltimore, is considered by Dr. Francis G. Benedict, of the Carnegie Institution's Nutrition Laboratory at Boston, to be absolutely unique.

Not even ill patients in hospitals who exhale and inhale ten times a minute approach the usual rate of respiration of this physiologist who, while willing to aid science by studying the cause of her unique ability and demonstrating it to the public, desires to remain anonymous in printed reports.

Her unique rate of respiration was discovered about five years ago when as a student of physiology at Mt. Holyoke she noted that she did not breathe as fast as her fellow-students. The phenomenon came to the attention of Dr. Benedict, a leading research worker in the field of human physiology. He studied it and then traveled over Europe, lecturing to some 70,000 physicians in some 20 cities in an effort to find a similar case. A thorough search of the scientific literature was also made. No other instance of such slow breathing has ever been found.

Although her breathing is slow, the depth of the breathing is greater than normal. She inhales three pints of air at a time, whereas ordinary people take in and let out only one pint. Her lung capacity, however, is normal and not larger than that of the average person. The air passing through her lungs is normal in amount and the amount of oxygen she extracts from it is also normal.

If she were a singer, she would be able to hold her notes a phenomenally long time. Dr. Benedict has urged her to attempt singing as an experiment, but her interests lie in the field of scientific research rather than music.

If she were a sprinter, which she is not, she would probably be able to run 200 yards on a single breath, whereas the ordinary runner completes a hundred-yard dash in one intake of air.

In the demonstration, the young physiologist wears a special form of respiration mask, like an inverted bucket, which fits over the head. A rubber collar closes the open end, while a celluloid window permits her to see what is going on about her. Air enters through a tube at the top, and is sucked out through a tube at the side by means of a small electric blower. The exhaust air is drawn through chemicals to absorb the carbon dioxide breathed out of the lungs. After being thus purified, the air goes back to the mask and is breathed over again. A collapsible cylinder, like a city gas tank, goes up and down as the subject breathes out and in, while a pen attached to it writes a permanent record of the breathing volume on a revolving paper cylinder.

As the substance of the body burns to produce heat, oxygen is changed into carbon dioxide, and so the volume of air in the apparatus is gradually reduced. For every liter (approximately a quart) of oxygen that is used, about five calories, or heat units, are produced. Therefore, by measuring the rate at which oxygen is used up, the heat produced by the subject can be measured.

### *Astronomy and Movies*

Partly because movie producers wanted a film that would give night effects to pictures taken in the daytime, Mt. Wilson Observatory astronomers have been able to prove conclusively the presence in the sun of carbon, most typical element of all living things, by spectrum photographs in infra-red light.

Speaking at the Carnegie Institution of Washington, Harold D. Babcock, of the Mt. Wilson Observatory, told of this and other phases of his researches into methods of taking photographs with light vibrating too slowly to be seen. This is called the infra-red region of the spectrum. Apparatus used in these studies was shown at the annual exhibition of the Institution in Washington.

When the white light of sunshine is broken up by the prisms of a spectroscope, it is spread out into the familiar colored spectrum, ranging from the shortest and most rapidly vibrating rays that make violet light to the

longer and more slowly vibrating red rays. Though not visible to the eye, the spectrum extends far beyond each end. Ordinary photographic plates record the ultraviolet or the region beyond the violet end, but are insensitive to even the visible red. Panchromatic plates are sensitive to red light, but not to a great deal of the infra-red, the still longer waves. These are the heat waves, and so it has been possible to study them by temperature effects. At best, however, this method is not as good as direct photography, and physicists and astronomers have sought a way of photographing these long waves. Many years ago Sir William Abney, an English experimenter, succeeded in photographing by very long infra-red rays, but his method was difficult and uncertain, and has not been used extensively since.

## *Neocyanin*

The movie producers sought a way of photographing night scenes in the daytime, so as to avoid the use of powerful and expensive lights required for night photography out of doors. Photographs made by infra-red light give a black sky, and so they sought film to take movies by the infra-red part of sunlight. To meet this commercial need, explained Mr. Babcock, research chemists at the laboratories of the Eastman Kodak Company produced a new dye, neocyanin. Film or plates bathed in a solution of this dye acquire sensitivity to infra-red light.

Mr. Babcock also showed a photograph taken by these same plates in absolute darkness, to the eye. Using three bowl-type electric heaters, supplied with just enough current to heat their coils, without giving any visible red light whatever, he photographed some bottles and laboratory apparatus by infra-red light. An exposure of 48 hours was required.

All our knowlelge of the atoms that are in the sun and how they are put together comes from a study of the dark lines that appear in its spectrum photographs.

"The significance of lines in the spectrum lies in the fact that they announce the occurrence of definite changes of atomic energy," said Mr. Babcock. "The arrangement of lines in the spectra of the elements leads to a knowledge of the arrangement of the outer electrons of the atoms, of fundamental importance to the understanding of their physical and chemical relationships."

With the new plates, it is possible to extend this study far into the invisible infra-red part of the spectrum. Mr. Babcock has made photographs of the solar spectrum by light waves half again as long as the longest visible red waves. These waves are about twice as long as those of green light, and lie about twice as far beyond the end of the visible spectrum as those photographed by Sir William Abney.

One of the first results of this new method has been the definite proof of the presence of carbon in the sun. Previously only a few weak lines of this element have been photographed, but with the new plates one of the principal groups of the lines of carbon can be recorded. These are in the same position as carbon lines from a terrestrial source, and show conclusively that the sun, like our own bodies, contains carbon.

## *Making Radium Rays*

Artificial radium rays, produced by 1,600,000 volts of electricity in special vacuum tubes, have now been achieved by the Institution's physicists. The tubes are really X-ray tubes, and by applying voltages of from one-half to several million, rays similar to the gamma rays of radium are emitted. The other kinds of radium rays, known as alpha and beta rays, can be produced by suitably modifying such a tube. With the aid of these rays, the Carnegie physicists are studying the heart of the atom.

The tube is composed of many separate X-ray tubes, with the rays feeding from one into the next. The entire battery of tubes is immersed in oil, while each one is individually shielded from the others. This makes possible smaller tubes and higher voltages than Dr. W. D. Coolidge, of the General Electric Co., used in a somewhat similar experiment.

## *Fossil Cats*

Portraits of the giant cats that once roamed North America were a feature of the exhibition. Fossil finds at various places, but especially at the famous La Brea tar pits in California, have made possible the collection of an unusually complete series of skulls, representing all stages from kittenhood to snarling old age.

There are two definite types shown in the big-cat group of Ice Age time in America. One is the famous saber-tooth tiger, which used its exaggerated upper eyeteeth for killing its prey and fighting its enemies. The other is a more orthodox cat, a great lion, which has a skull and tooth arrangement more like those of the present-day lions and tigers.

*Science News-Letter, December 21, 1929*

**Dr. Edward L. Fox, of the Nutrition Laboratory, with the apparatus that measures breathing, testing the respiration of the young lady who breaths three to five times a minute.**

## *Wild Boar*

By his fruitfulness and cunning the wild boar of Europe, traditional pièce de résistance at Christmas feasts, is managing to hold his own in spite of the lack of protective game laws of any kind.

In eastern Germany, particularly Brandenburg and Pomerania, the land owners appreciate the value of the boar to the forests and see that he is not hunted down too closely. Eighty-five per cent. of injurious forest insects and small animals are destroyed by the boar, it has been estimated.

In west and south Germany, however, the asset of the boar to forest land is not so well understood and he is persecuted severely. Upwards of 12,000 are said to have been killed in Germany in 1925.

*Zoology*
*Science News-Letter, December 21, 1929*

## *Unthinkable*

Relaxation of traffic regulations to allow higher rates of speed on streets and highways is unthinkable, officers of the Metropolitan Life Insurance Co. have decided after reviewing the present situation in regard to automobile fatalities.

Speeding is the principal source of auto deaths, the company's figures show. This is the only type of accidental death now increasing in this country. Automobile accidents are responsible for more than 2 per cent. of all deaths from all causes. The cumulative death rate from this cause for the first ten months of 1929 was 19.5 per 100,000.

*Statistics*
*Science News-Letter, December 21, 1929*

## *Star Size*

Within a few weeks the newest and one of the largest instruments of the Mt. Wilson Observatory near Pasadena will be in operation and will begin to reveal the diameters of a number of stars. The fifty-foot interferometer it is called, and it has been under construction for nearly eight years. It is based on the same principle as the 20-foot interferometer designed by Prof. A. A. Michelson and used as an attachment to the great 100-inch reflecting telescope at the observatory by F. G. Pease, to measure the first diameter of a star. This was Betelgeuse, now visible in the southern evening sky in Orion, above the familiar row of three stars that form Orion's belt. He found its diameter to be 215 million miles.

In this new instrument a beam 50 feet long carries a flat mirror at each end, which reflects the light from the star to the center of the beam. Two additional mirrors then reflect the light to a concave mirror which brings the light rays to a focus. The waves in the two beams "interfere" with each other, producing a series of bands, instead of a sharp point of light. By sliding the outer mirrors along the beam, a position is reached when the bands disappear. From the distance between the two mirrors when this happens, the apparent diameter of the star, or the angle that lines from its two sides would make at the earth, can be calculated. Knowing its distance, its diameter can be determined.

Only a few stars are large enough to be measured with the twenty-foot beam of the interferometer formerly used, but with the new one, perhaps 20 or 30 more will reveal their diameters to the astronomers.

*Astronomy*
*Science News-Letter, December 21, 1929*

## *Sunny Travel*

Travelers to the south of England for winter holidays may now count on the benefits of the vacation beginning almost the moment they board the train. For its Cornish Riviera express service, an enterprising railway has fitted all its cars with window glass permeable to ultraviolet light. In this way passengers are assured the full value of the sunlight as they travel. The Cornish Riviera is so called because Cornwall, in the extreme south of England, has pleasant, mild winters with more than the average amount of sunshine. It is a favorite winter resort where inhabitants of fog-ridden, smoky cities go for intensive doses of sunlight and health-giving ultraviolet rays.

*Public Health*
*Science News-Letter, December 21, 1929*

## *New Gem*

The new element, hafnium, may be the solution of the latest jewel mystery. A sparkling deep blue zircon, more beautiful as a gem than the usual brown, greenish or yellow varieties of that mineral, puzzled jewelers and mineralogists when it appeared on the market from Australia, Ceylon and other eastern countries about five years ago.

Dr. George F. Kunz, jewel expert of Tiffany's, who gave the new gem the name "Starlite," believed the mineral to be artificially colored, but knew no such beautiful color resulting from the elements known to occur in zircon. When he set about solving the mystery he learned that, although shipped from various places, the crystals of

# IN VARIOUS FI

blue zircon all originated from a single place, near Chantaboon in Siam. There the brown mineral, before being cut, was heated with cyanide of potassium in a closed crucible for some hours, coming out a color ranging from nearly white to deep sapphire-blue depending on the length of the treatment.

Only the heavier varieties of the mineral, which occurs in an unusual range of weights, will take on the blue color, and Dr. Kunz has found that the heavier kinds of zircon are the ones containing hafnium. He therefore believes that the mysterious color is a manifestation of this little-known element.

Hafnium was discovered in 1923 by D. Coster and G. Hevesy of Copenhagen, who found that it is a metal similar to zirconium, which is found in the mineral zircon. Although so long unknown, hafnium is by no means rare. It is believed to make up about 1/200,000 of the earth's crust.

*Chemistry*
*Science News-Letter, December 21, 1929*

## *Elderberry*

Navajo Indians employed in road work in Mesa Verde National Park saved for the park its one and only elderberry bush, which had to be moved from its old location to permit the construction of a portion of the scenic Knife Edge road. The Navajos channeled about the roots of the bush so that it would be moved in a large block of earth. Then when the new hole was made, cables were adjusted, hooked over the shovel teeth, the bush raised, taken by shovel to the new location, and reset.

The bush, a very fine and large specimen, was then cut back approximately forty per cent. to insure its future growth.

*Botany*
*Science News-Letter, December 21, 1929*

## *Delay Reform*

Action in the United States relative to this country's participation in an international conference for calendar reform will be delayed for a time until some indication is given as to what the countries of Europe intend to do about it, according to Representative Stephen Porter, chairman of the House Foreign Relations Committee.

Hearings on the Porter resolution

# S CIENCE FIELDS

for participation of the United States in such a conference were concluded by the House Foreign Affairs Committee in the seventieth congress. These hearings, Representative Porter believes, have thoroughly covered the subject. They are now being printed. When the resolution is again introduced and comes before the committee, action by the committee can be taken without further public hearings.

It is understood that a new referendum of business organizations conducted by the United States Chamber of Commerce has totaled some entirely different figures than those reported during the latter part of October, at which time the Chamber reported a failure to poll a two-thirds majority among their members for any one of the three proposals put forward looking to a calendar change, or the participation of the United States in working out such changes with other countries.

A new count is said to reveal that two-thirds of the members want the United States to take part in a conference to draft the change, if there is to be a change.

*Chronology*

*Science News-Letter, December 21, 1929*

## *Ambrose Light*

Next year's returning European travelers will see Ambrose light a little sooner than they do this year. The famous beacon that marks the entrance to New York harbor has been moved one and an eighth miles south and a little east of its present position, George R. Putnam, U. S. Commissioner of Lighthouses, announced.

The advantages of the new position will be that ships will be guided well south of a bank only 40 feet deep in places, and that they will not need to change course between the light and the entrance to Ambrose Channel. The new position is directly on line with the center line of the channel.

*Navigation*

*Science News-Letter, December 21, 1929*

## *Helium*

There are natural gas wells in Germany whose output contains helium, writes Kurt Weil in *Die Umschau*, a well-known German scientific periodical. But there is no prospect of the *Graf Zeppelin* or any of her future sister airships being filled with German helium, for the combined product of all the four German wells whose gas contains this valuable element would have to be accumulated for 400 years before there would be enough to fill the *Graf*.

By means of extremely delicate tests devised by Profs. Paneth and Peters, noted German analytical chemists, the percentage of helium was determined for a number of gas wells in Germany. The richest of these was a small well at Ahlen, Westphalia, whose product assayed nineteen hundredths of one per cent helium. But this well flows only 41 cubic meters of gas a day, and would therefore yield the relatively insignificant volume of eight-tenths of a cubic meter of helium in that period. As compared with this, Herr Weil cites the great American well at Petrolia, Texas, which yields 425,000 cubic meters of gas, with a helium content of nine-tenths of one per cent. This would fill a Graf Zeppelin in a few days. The German writer adds the comment that Nature has treated Germany, the home of the Zeppelin, "like a stepmother."

*Chemistry*

*Science News-Letter, December 21, 1929*

## *Cooking Soil*

The partial sterilization of soil by heat has recently been investigated by Dr. W. F. Bewley, director of the Experimental and Research Station at Cheshunt, England. Dr. Bewley finds that the heat not only destroys pests and diseases but also greatly increases soil fertility and encourages the production of healthier plants. Soils are heated for about half an hour at the temperature of boiling water. Heavy soils require more heating than light sandy soils.

The bacteria and fungi whch cause diseases in plant roots are destroyed, but the beneficial soil bacteria are not killed and have fuller scope for their development. The heat also causes complex organic and inorganic substances to be converted into simpler substances which are more useful for the plant and the soil bacteria.

The heating may be carried out either by baking the soil or by passing a current of steam through it. Steaming is the best method, as baked soils often become too dry, and if overheated they are ruined. The heating must be thorough, especially in the case of badly contaminated soils. If some parts of the soil are insufficiently heated, centers of infection remain, from which disease organisms can rapidly spread through the rest of the soil.

*Agriculture*

*Science News-Letter, December 21, 1929*

## *Chemical Surgery*

A method of removing a diseased organ by chemical rather than surgical means was described by Dr. Charles H. Mayo of Rochester, Minn., at the meeting of the Southern Surgical Association. The technical term for the operation is "chemical hysterectomy."

The procedure is particularly valuable in cases when the usual surgical methods of hysterectomy would be too dangerous to undertake because of the presence of serious disease in the heart or kidneys as well as in the organ to be removed. Of course, regular surgical operation is preferable if it can be done.

In the method followed by Dr. Mayo zinc chloride is the chemical used. A few other surgeons have also tried chemical means. Dr. Mayo has followed the procedure in 26 cases in which it was unsafe to operate by one of the usual procedures. He believes that, in its limited field, the method is of value. Carefully done, it has been safe. The patient, unless she is in bad general condition, can be out of bed in five or six days, he said.

*Surgery*

*Science News-Letter, December 21, 1929*

## *Lot Method*

Continuous production is not always the secret of the low cost for which the American automobile is produced and sold, Prof. Fairfield E. Raymond, of the Massachusetts Institute of Technology, reveals in a report to the Society of Automotive Engineers.

The apparent ease and rapidity with which automobiles are made have created the impression in the minds of many people that the process depends somewhat on the hand of magic. They picture four wheels beginning to move at the end of a long runway, and half an hour later the four wheels emerge at the other end, a complete automobile.

But Prof. Raymond observes that many of the automobile factories are producing parts and certain types of cars by the lot method and are finding it cheaper. The lot method is especially applicable in the manufacture of parts and cars of which very large numbers are not required continuously. In order to help the manufacturers find out when to change from one method to the other, Prof. Raymond has prepared from many carefully conducted experiments a series of scientifically accurate formulas for application under different conditions.

*Engineering*

*Science News-Letter, December 21, 1929*

# Topless Towers of Ilium —A Science Classic

*Archæology*

**Fair Helen probably wore a gold headdress like this one, which was found in the ruins of the city she made famous.**

**To know more of Troy than Homer did, to stand among the ruins of the burned city as it was left by Menelaus and his recaptured Helen, by Agamemnon and Odysseus and the rest, was the romantic destiny of the German archæologist Schliemann. We reprint the description of the find from the American edition of his book. He found reality curiously shrunken when compared with the poet's description, proving that the famous siege was already legendary in Homer's day.**

*ILIOS, The City and Country of the Trojans. The results of researches and discoveries on the site of Troy and throughout the Troad in the years* 1871-72-73-78-79. *By Dr. Henry Schliemann, New York,* 1881.

By far the most remarkable of all the houses which I have brought to light in the third, the burnt city, is undoubtedly the mansion immediately to the north-west of the gate, which I attribute to the town-chief or king; first, because this is by far the largest house of all; and secondly, because, as before stated, I found in or close to it nine out of the ten treasures which were discovered, as well as a very large quantity of pottery, which, though without painting and of the same forms as that found elsewhere, was distinguished, generally speaking, by its fabric. A good view of this royal mansion is given in the engraving, from a drawing made by my late lamented friend Dr. Edward Moss in November 1878, when the buildings in the foreground, which appear to be its dependencies, had not yet been excavated. Just in front of the entrance to the chief or king's mansion is an open place; this is the only open place in the town, and may therefore have been the Agora. This would agree with Homer, who tells us that the Trojans, young and old, were assembled in the Agora before the king's doors. In another passage the poet tells us that the Trojans held a tumultous and stormy Agora before the king's door in the Acropolis of Ilium.

What the reader sees of the town-chief's mansion in the engraving are merely the walls of the ground-floor, 4 ft. 4 in. high on the average, which consist of small uncut stones joined with earth, and also (as M. Burnouf finds), "with ashes containing charcoal, shells, fragments of pottery, and broken bones; with brick-matter mixed with grey earth, and with a *magma* of yellow earth and ashes. There are also in these house-walls fragments of bricks, more or less baked, as well as fragments of large jars supplying sometimes the place of stones (in the second and third walls). The base of the walls is composed of small clay cakes, yellow earth, grey or brown or black ashes, and fragments of bricks laid in all directions. There are also large pieces of charcoal, marking the place of the beams of which the floor seems to have consisted.

"The coatings of the walls are composed of the same *magma* as the matter with which the stones are joined. The finest coatings are smoothed, not with a trowel, but with a sort of whitish-yellow clay-milk, which has left a layer as thick as paper; there are coatings of two or three such layers. This *painting*, if we may call it so, follows all the sinuosities of the coating, which itself follows those of the wall. This clay-milk has not a uniform colour; it borrows its colour from the ground which it covers; it consequently seems to have been made simply with water, with which the surface of the coating has repeatedly been washed.

"The coatings which are less fine (second chamber) are composed of the same materials, mixed with straw, of which the projections and the hollows may be seen on the surface of the coating. This process is still in use in the country.

"The walls of this house have not been built on a burnt soil, but have themselves been exposed to an intense heat in the great conflagration. The black vapour of the intense heat has here and there penetrated far into them, particularly the lower part."

In the absence of cellars, this ground-floor served as a store-room. A similar practice of using the ground-floor as a store-room appears to have existed at the time of Homer, for we see in the *Iliad* that Hecuba *descends* to the store-room, where the skillfully embroidered vestures were stored. Had the store-room been on the floor inhabited by the family, the poet would not have said that the queen descended. If asked:—Is this Priam's palace as described by Homer —"But when he came to Priam's splendid house, adorned with polished corridors, in which were fifty chambers built of polished stone, all side by side. There the sons of Priam slept with their wedded wives. Facing these on the other side of the court within were built twelve covered chambers, side by side, of polished stone. There the sons-in-law of Priam slept beside their chaste wives:"—I would answer with the verse of Virgil.

"Si parva licet componere magnis." But Homer can never have seen the Troy whose tragic fate he describes, because at his time, and probably ages before his time, the city he glorifies was buried beneath mountains of *débris*. In his time public edifices, and probably also royal mansions, were built of polished stones; he therefore attributes the same architecture to Priam's mansion, magnifying it with poetic licence.

This building has towards the gate a corridor 40 ft. 8 in. long by 6 ft. wide, leading to a chamber only 7 ft. 6 in. long by 4 ft. 6 in. broad, in which the ingenious Dr. Moss discovered a gutter of hemispherical form; this room is nearly filled up by a huge jar 5 ft. 6 in. high and 4 ft. 6 in. broad in the body. By a doorway only 1 ft. 10 in. wide, this chamber communicates with another and larger one, which is 12 ft. 3½ in. long and 7 ft. 4 in. broad, and contains three immense jars of precisely the same size as that just referred to, and a somewhat smaller one: the pottery of the jars is upwards of 2 in. thick. From this room we enter by a doorway, 3 ft. 2 in. wide, into a larger one, which runs parallel with the aforesaid corridor, and is 24 ft. 4 in. long and 12 ft. broad, and leads to another chamber 10 ft. long and 8 ft. broad. This is the best preserved part of the mansion, to which —as above said—must also belong the buildings which separate it from the northern part of the great wall.

This large house, as well as its dependencies to the north, was buried 9 and 10 ft. deep in mounds of bricks and yellow wood-ashes, which cannot but belong to the walls of the upper storeys, and go far to prove that these buildings had many upper floors and were perhaps five or six storeys high. I therefore do not see any reason why the mansion, with its dependencies, may not have had even more than 100 rooms, smaller or larger.

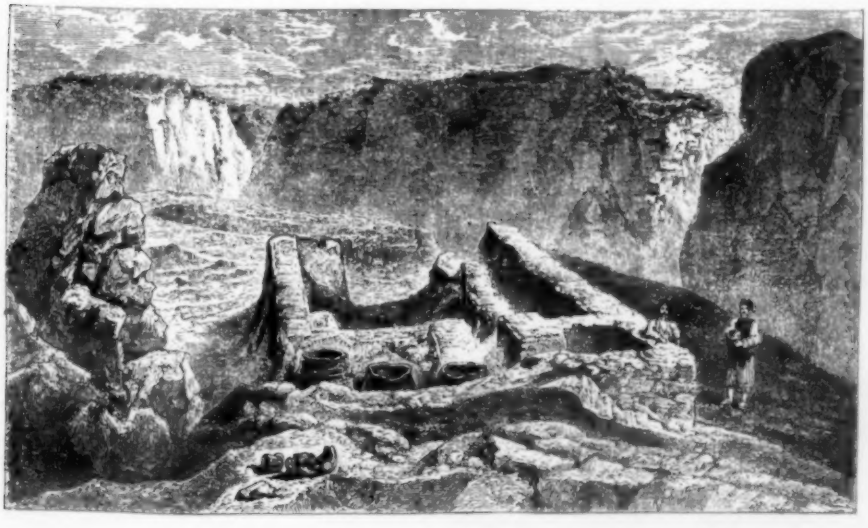
The bricks are nearly all broken; I secured, however, some entire ones, which are 2 ft. long, 1 ft. 3 in. broad, and 3½ in. thick, and which have been converted by the conflagration into a sort of baked brick. But far from rendering them more solid, the intense heat has made them for the most part very fragile, and it has more or less vitrified a vast number of them.

The pottery of this third city is nearly all hand-made, and, having been baked at an open fire, it was certainly not more baked than that of all the other pre-historic cities at Hissarlik. The intense heat of the conflagration has sufficed to bake it thoroughly in a great many instances, but by no means always; nay, as we distinctly see in the fracture, by far the greater part of the pottery is not thoroughly baked. Among that thoroughly baked is certainly all the broken pottery, which was so exposed to the fire that the intense heat reached it on both sides; but wherever this has not been the case, the original baking of the pottery was only increased by the fire, still remaining incomplete in a great many instances. The conflagration, however, has sufficed to give to most of the pottery a red tinge or a lustrous light or dark red colour, from the oxide of iron contained in the clay. . . .

As we have seen in the preceding pages, the third city of Hissarlik perfectly agrees with the Homeric indications as to the site of Troy; and the fact that there is no second place in the Troad which could possibly vie with it, goes far to prove its identity, the more so as the third city has, like the Homeric Ilois, been destroyed by the hand of an enemy in a fearful catastrophe, which fell on it so suddenly that the inhabitants had to leave even a large part of their treasures behind. In this respect also the third city aggrees with the Homeric description, because the poet says: "Priam's city used to be far-famed for its wealth in gold and bronze, but now the precious wealth has disappeared from its houses." If, therefore, in spite of its exhausttion by a long-protracted siege, the third city of Hissarlik was still so rich that I could find in it ten treasures, this is an additional proof of its identity with the poet's Ilios.

In proportion to the wealth and power of Ilium it was but natural that the sudden catastrophe, by which this rich and famous capital of the Trojan kingdom perished, should have made a very deep impression on the minds of men, both in Asia Minor and in Greece, and that it should at once have been taken up by the bards. But while, as Mr. Gladstone says, the local features of the site and Plain of Troy were given sufficiently for a broad identification, the bards handled them loosely and at will in point of detail. They treated the Plain without any assumption of a minute acquaintance with it, like one who was sketching a picture for his hearers, boldly but slightly, and not as one who laid his scene in a place with which he was already personally acquainted, and which formed by far the most famous portion of the country he inhabited. The ruins of the burnt Ilium having been completely buried under the ashes and *débris*, and people having no archaeological desire for the investigation of the matter, it was thought that the destroyed city had completely disappeared. The imagination of the bards had, therefore, full play; the small Ilium grew in their songs, in the same proportion as the strength of the Greek fleet, the power of the besieging army, and the great actions of the heroes; the gods were made to participate in the war, and innumerable legends were grouped around the magnified facts.

I wish I could have proved Homer to have been an eye-witness of the Trojan war— Alas, I cannot do it! At his time swords were in universal use and iron was known, whereas they were totally unknown at Troy. Besides, the civilization he describes is later by centuries than that which I have brought to light in the excavations. Homer gives us the legend of Ilium's tragic fate as it was handed down to him by preceding bards, clothing the traditional facts of the war and destruction of Troy in the garb of his own day. Neither (*Turn to page* 390)



**Ground Floor of the Royal Mansion of Troy, where supplies for the household were stored.**

# South Africa to Have Largest Telescope South of Equator

*Astronomy*

WHAT will be the largest telescope south of the equator is now under final test at Pittsburgh, preparatory to dismantling it for shipment to its final home in South Africa. The new instrument, a reflecting telescope with a mirror five feet in diameter, has been built for the southern station of the Harvard College Observatory, at Bloemfontein, by J. W. Fecker. Harvard astronomers are now using it to make photographs of the stars. So far, it seems to be entirely satisfactory and free from measurable error.

The mounting of the telescope was designed by Mr. Fecker and built in his shops. The huge mirror, exceeded in size by only three others now in use, previously belonged to the Harvard Observatory, but was not satisfactory. It has been refigured in the Fecker works and provided with a special mounting to prevent it from bending, as it was formerly thought too thin to be of use.

When erected in South Africa, the Harvard station at Bloemfontein will have several large instruments adapted to photography of the southern skies. In addition to the big reflector, a refracting telescope, with a photographic lens 24 inches in diameter, is already in use, as well as a number of smaller telescopes.

The mirror for the world's third largest telescope is also undergoing completion at the same place. This is the 69-inch disc made last year at the Bureau of Standards in Washington, and intended for the Perkins Observatory at Ohio Wesleyan University, Delaware, Ohio. The instrument was completed with the intention of using a 60-inch mirror. As the Bureau of Standards' scientists succeeded in maka bigger disc than anticipated, Mr. Fecker has also built a new tube for the telescope, to use the mirror to its full advantage.

Mr. Fecker is the successor of John A. Brashear, one of the most famous makers of large telescopes and lenses.

With three groups of European astronomers planning separate observatories in South Africa, in addition to the six large ones already there, this is rapidly becoming one of the world's great astronomical centers. Already it is the chief center of Southern Hemisphere observatories.

The University of Leyden, Holland, will be the next northern observatory to establish a branch south of the Equator to observe parts of the sky invisible from Europe or North America. Prof. W. de Sitter, director of the Leyden Observatory, has recently inspected South African sites, and decided to locate the branch on the grounds of the Union Observatory at Johannesburg.

Another southern observatory is to be established at the Cape as a joint enterprise of all the German observatories. Prof. P. Guthnick, director of the Berlin University Observatory at Neubabelsberg, a suburb of Berlin, also made a recent inspection of possible sites. So far he has not decided between Bloemfontein, Pretoria and Windhoek, but it is believed that he favors the former.

In addition to these, it is planned to move the Radcliffe Observatory, now at Oxford, England, to South Africa. This institution, equipped with an 18-inch refracting telescope in addition to smaller instruments, has no connection with the University of Oxford, which has its own observatory. Sir Frank Dyson, Astronomer Royal, and Dr. H. Knox-Shaw, in charge of the Radcliffe Observatory, recently visited possible locations. So far they have not decided between Bloemfontein and Pretoria.

The Royal Observatory, at Cape Town, is the oldest of the present South African observatories. Its largest telescope is a refractor with a lens 24 inches in diameter. The University of South Africa, also in Cape Town, boasts an 18-inch refractor.

At Johannesburg is located the Union Observatory, with a 26-inch refractor. Both the University of Michigan and Yale University have established branches on the Union Observatory grounds with 27-inch and 26-inch refracting telescopes, respectively.

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# Traces of Ancient Man Reported

## Texan Finds Relics He Believes Very Old

*Archæology*

DISCOVERY of traces of human habitation which appear very old have been reported from the vicinity of Abilene, Texas, by Dr. Cyrus N. Ray, a Texan, who devotes his spare time to unearthing prehistory of the state.

A ranch owner declared that he had found some holes made by Indians in a ledge of rocks. Dr. Ray visited the site and counted 84 oval holes, probably mortar holes, hollowed in the great boulders by Indians so that they could conveniently pound up mesquite beans and other foods.

Searching more extensively, he found nearby the debris of a human camp site, with hearths, arrowheads, hammerstones, stone scrapers, and mussel shells. Seeking clues to the age of the hand-wrought stone tools and weapons, he observed that there is no permanent water supply within many miles, yet when a camp of such size was occupied there would have been need for a dependable water source.

A more striking clue to age is cited from the appearance of the boulders containing the mortar holes. Some of the boulders which were tilted slantwise appear to have been deeply eroded. Mortar holes in these stones are only shallow depressions, as contrasted with the other mortar holes which are 13 to 17 inches deep.

"It must have taken a tremendous lapse of time for the action of the rain water which fell on each stone to have dissolved and completely carried away the whole surfaces of large, hard stones to depths of ten or fifteen inches," Dr. Ray stated.

New discoveries of a spear point, hearth rocks, animal bones, and flint flesh scrapers sticking out of the side of the high Brazos River bank are also reported by this investigator. These stone scrapers and other objects are buried in the same geological layer of clay, beneath six to eight feet of soil, in which two skeletons were found some months ago, he has stated. The new finds are at three places along the river and side creeks, thirty or more miles away from the skeletons, but all are declared to be in the same deeply buried stratum of soil. A geological survey of the region will be necessary before definite conclusions as to the age of the discoveries can be drawn.

The new discoveries appear to be worth investigating, in the opinion of scientists of the Smithsonian Institution.

Whether the Texas finds are evidence of ancient man in America or whether they are handiwork of fairly recent prehistoric tribes can only be determined by expert examination of the objects and of the geology of the region, Dr. J. W. Gidley, paleontologist, declared. Dr. Gidley, whose own discoveries in Florida led him to believe that man has inhabited America as far back as the days of the mastodons and other beasts extinct for some 20,000 years, pointed out that Texas would have been a favorable climate for a very primitive existence. Geologists of Texas should render their verdict as to the age of the deposits, he urged.

Dr. Walter Hough, well-known anthropologist, who visited the scenes where Dr. Ray has been making discoveries this summer found several flints manifestly worked by human hands and lying buried in apparently undisturbed gravel under eleven feet of soil along the banks of Elm Creek. This site, to which Dr. Hough was led by the Texas investigator, impressed Dr. Hough as being the most curious and the most worthy of study of the various Texas mysteries. The geology of the gravel formations is not thoroughly known, and therefore the antiquity of these deeply buried tools remains to be determined.

At present, commercial interests have been most concerned with the gravel as good road-building material, and the bones and other significant objects in the gravel are shoveled away.

*Science News-Letter, December 21, 1929*

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Japanese and French silk worms have only one or two crops a year, whereas Cantonese worms have from seven to nine crops of cocoons annually.


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## Toys Tell History of Race—*Continued*

his opponent so as to heave him out of the saddle.

One of these miniature knights, now in the Bavarian National Museum at Munich, is so grand that it could only have been intended for a young princeling. The work of the most skilled armorer was necessary to reproduce the minutely detailed copy of a knight's harness. The figures of the horse and his rider are the work of expert carvers, while the trappings of thin silk are a precise copy of the full-sized original in tournament array.

There are no records to show how the manufacture of toys was regulated by the medieval guilds. Only by the sixteenth century is it possible to get a glimpse of how the famous toy trade of Germany was organized. Manufacture of objects for the church had been falling off in many places, especially in the north of Germany. Consequently, artists and craftsmen began to cast about for a less pretentious medium for their craft.

About this time the collecting habit arose. That pride and joy of a little girl's heart, the doll house, became the plaything of queens and duchesses. Even the substantial burghers of Holland wasted fortunes on them. They became, in fact, curio cabinets and a sort of symbol or outward sign of the collector-owner's wealth and position. The new craze, of course, stimulated toy making. Nuremberg became the center of the toy industry of the world, though Augsberg and Ulm also became renowned for their doll houses, furniture and fittings.

Many of the furnishings were made by craftsmen as incidentals to their trade, for the regulations of the old-time guilds were as complicated as those of any present-day plumbers' or carpenters' union. The cabinet-maker made to order the furniture for the doll house, the tin and cooper smiths the utensils and the potter the tiny bits of crockery. Thus each trade got a share of the business. With such restrictions there could be no toy factory in the modern sense of the word, for even the man who made the dols' heads could not paint the faces on them. They had to be turned over to a fellow who was known as a "bismuth painter."

Nuremberg did not rest its reputation as a toy town entirely on the local craftsmen. It was really a distribution depot for the simple wooden toys made by the peasants of Berchtesgaden, Thuringia and Oberammergau, who spent the long winter months carving household utensils, such as spoons and bowls, and eventually toys.

At first the craft was a purely home industry, but the peasant carvers gradually came to conform to the demands of the trade until toys from these regions took on a characteristic uniform appearance well known to all parts of the globe where Nuremberg toy agents penetrated.

Oberammergau, the home of the Passion Play, was the first place, so far as can be learned, where these light and pretty toys were made. Their manufacture sprang up first in connection with the carving of crucifixes and images of the saints. The workers considered themselves artists and organized a carvers' guild. Unhappily, the growth of mass production has forced this type of artisan practically out of existence. He has become a factory hand and his individual touch, which gave the inexpensive toys of the past personality and charm has vanished completely.

*Science News-Letter, December 21, 1929*

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## Ilium—*Cont'd*

will I maintain that his acquaintance with the Troad and with Troy was that of a resident; but certainly he was not without personal knowledge of the localities, for his descriptions of the Troad in general, and of the Plain of Troy in particular, are too truthful for us to believe that he could have drawn all his details from the ancient myth. If, as appears likely, he visited the Plain in the ninth century B. C., he would propably have found the Aeolic Ilium already long established, having its Acropolis on Hissarlik and its lower town on the site of Novum Ilium. It would, therefore, be but natural that he should depict Priam's Troy as a large city, with an acropolis called Pergamos, the more so as in his time every larger city had its Acropolis. My excavations have reduced the Homeric Ilium to its real proportions.

*Science News-Letter, December 21, 1929*

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# Drama of Hard Times Read in Ruins

*Archæology*

An unwritten drama of American prehistory has been pieced together from exploration of a fortress-like ruin known as Mesa House, by M. R. Harrington, who has returned from directing an archæological expedition to Nevada for the Southwest Museum.

This pueblo was built for defense on the top of an inaccessible tableland near Overton, Nevada. The Pueblos who lived in southern Nevada in the early centuries of the Christian era had enjoyed peace and prosperity in the "Lost City," their metropolis, and in other scattered communities in the lowlands of the Moapa Valley. But then these scattered homes were abandoned for the safer retreat of Mesa House, a crudely built high fort, and here followed a period of distress, poverty, and final disaster, the expedition has discovered.

Poverty is shown at Mesa House by the scarcity of beads and ornaments, which were so abundant at the Lost City, Mr. Harrington explained. Only bare necessities of life are found in the ruins.

"The rooms of Mesa House were of solid adobe and stone construction, built around a court to which only three narrow gateways gave access," he stated. "Outside of the stronghold were a number of scattered, one-room dugouts, which seem to have been the homes of the people, who doubtless abandoned them to take refuge in the main structure at the first alarm of danger.

"An unusual number of arrowheads found tell the story of preparation for an attack. But whether this came and the inhabitants were massacred or whether they quietly withdrew to the larger Pueblo settlements in Arizona without a battle cannot now be determined fully; although the finding of a large earthen cooking pot artfully hidden against its owner's return would suggest the latter."

Mr. Harrington considers it likely that the enemy so dreaded and prepared against were ancestors of the present Southern Paiutes, still living in the upper end of the Moapa Valley.

The excavations reveal a picture of the last days of the Pueblos in Nevada, and pottery found at the site tells the time at which these Indians made their last stand. Crude and primitive as Mesa House was, it was occupied in the days when Pueblo Indians of New Mexico and Arizona were building the largest and finest homes ever erected by Indians north of Mexico. This great period of Pueblo civilization occurred during approximately the same medieval centuries as the Crusaders in Europe. Among the pottery fragments from the Mesa House are some of a kind that were made in Arizona during this great period, and Mr. Harrington pointed out that the Arizona pottery was evidently brought out to the western frontiers of the Pueblo area by traders.

Besides excavating the Mesa House ruin, the expedition surveyed the lower Moapa Valley. In a district only 16 miles long and not more than two miles wide have been found a total of 77 distinct ruins and camp sites representing five different peoples or stages of culture.

*Science News-Letter, December 21, 1929*

## Do You Know That—

All but nine states have enacted regulatory air legislation, and the majority have accepted Federal standards.

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In Canada jack pine is now used more than any other wood for ties, because of its adaptability to creosote treatment and its natural strength.

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A sufficiency of playgrounds would cut in half the number of cases of child delinquency, declares the president of the Playground Association.

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There is a possibility that the ancient city of Gedi which has lain in ruins for centuries in the African jungle may be excavated.

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Archaeologists from the Oriental Institute exploring in Asia Minor have discovered 200 sites where the ancient Hittites tarried.

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Tests made in order to determine the best language for international telephone use indicate that Italian is the language most easily understood.

# Electrosurgery Great Aid for Cancer

*Surgery*

That novel adjunct to the surgeon's knife, electrosurgery, finds its greatest usefulness in the treatment of cancer, Dr. Howard A. Kelly, emeritus professor of gynecology and obstetrics in the Johns Hopkins University, told members of the Southern Surgical Association.

"The most important field for this novel agent lies in the realm of malignant growths and the various tumors," Dr. Kelly said.

This new method is not to be mistaken for merely a more convenient form of cautery, but is a specialty which must be learned with painstaking care, Dr. Kelly emphasized. He urged that the new procedure be given more attention in the big hospitals of the country, and that the younger generation of surgeons be given opportunities to test it out.

One very important advantage of electrosurgery is that it controls hemorrhage easily without the need of tying off each vein and artery, which must be done at each step of other surgical operations.

"In deep operations by older methods the surgeon often loses precious minutes in his efforts to check a severe hemorrhage and feels as well stopped from going further in that direction," explained Dr. Kelly. With electrosurgery the lymphatics and smaller blood vessels are sealed with the progress of the operation.

"It sterilizes the parts attacked, destroying all bacteria and septic tissues as well as the malignant cells to which the growth owes its specific character and continuance," said Dr. Kelly in outlining the advantages of the method. "There is further no handling and squeezing of the tissues, a great boon in any aggressive treatment of malignancy, avoiding the further distribution of the cells.

"One might also well call it a knife-and-fork operation, as the handling of the parts is limited to the slight sterilizing touch of the simple instruments used, avoiding even the gloved fingers of the surgeon.

"An immense advantage lies in the greatly enhanced facility in operating in areas awkward or difficult of access, as in the nose and throat."

Dr. Kelly described the method in some detail and added that it is even valuable, in some types of cases, when radium cannot be used any longer.

*Science News-Letter, December 21, 1929*

# FIRST GLANCES AT NEW BOOKS

LET'S BE NORMAL!—Fritz Kunkel—*Washburn* ($3). We may doubt the desirability of the subtitle, "The Psychologist Comes to His Senses," and we may be far from agreeing with much that this practical psycho-therapist has to say. Nevertheless, his ideas are thought-provoking and his emphasis upon normality is an interesting departure in psycho-analytic theory. Dr. Kunkel's theories have developed from the individual psychology of Alfred Adler. The translation from the German is by Eleanore Jensen.

*Psychology*
*Science News-Letter, December 21, 1929*

MOTHS AND BUTTERFLIES—Lina M. Johns and May Averill—*F. A. Owen Publishing Company, Dansville, N. Y.* (72c). A brightly illustrated little nature reader, suited for use in the second and third grades.

*Nature Study*
*Science News-Letter, December 21, 1929*

FUNDAMENTALS OF PATHOLOGY—Joseph Schroff—*Broder* ($2.50). Written from lectures in oral hygiene given at the School of Oral and Dental Surgery at Columbia University, this book gives practical, elementary information about specific diseases and disease processes. The emphasis, of course, is on diseases affecting the mouth and teeth. The book is clearly and concisely written and should be useful to technicians, hygienists and others who assist the dentist.

*Oral Hygiene*
*Science News-Letter, December 21, 1929*

BUILDING STRONG BODIES—Woods Hutchinson—*Houghton Mifflin Co.* (88c). This book preaches the gospel of outdoor play for health and strength. Games, organized sports, birds and flowers, gardening, scouting, setting-up exercises and first aid are all covered in considerable detail for so small a volume. The book is written for children in simple, direct style.

*Hygiene*
*Science News-Letter, December 21, 1929*

FUR LAWS FOR THE SEASON 1929-30—F. L. Earnshaw and F. G. Grimes—*U. S. Government Printing Office* (5c). Published as Farmers' Bulletin No. 1618, this digest of the fur laws of the various states will be useful both to conservationists and to legitimate trappers and hunters.

*Zoology*
*Science News-Letter, December 21, 1929*

AMERICA SET FREE—Count Hermann Keyserling—*Harpers* ($5). A work which the author states is "Not a book on America, but for Americans—a kind of psychoanalysis of the United States." Keyserling is typical of the intuitive school of literature; if ever he writes on the Antarctic he will prohibit the iceman from visiting his country home during the process. The fact that many will find the book a pertinent discussion of American social problems is proof that the Atlantic is not so wide and that Columbus and his successors came to America.

*Sociology—Philosophy*
*Science News-Letter, December 21, 1929*

MODERN GEOMETRY—Roger A. Johnson—*Houghton, Mifflin* ($3.50). An elementary treatise on the geometry of the circle and triangle, as developed extensively in the nineteenth century by British and Continental writers. It is an extension of the principles of Euclid, and is not to be confused with the non-Euclidean geometry that came into being around the same time. The book is intended primarily for a text for properly qualified college students, but the author believes that it will also be of value as a reference work.

*Mathematics*
*Science News-Letter, December 21, 1929*

RECHERCHES GEOLOGIQUES ET PROSPECTIONS POUR SELS POTASSIQUES EXECUTEES DURANT L'EXERCISE 1926/7 DANS LES REGIONS DE SOLIKAMSK ET DE BEREZNIKI—P. Préobrajensky—*Geological Committee (Leningrad)*. A tabular presentation, with 20 colored plates of newly discovered potash resources in the U. S. S. R. In Russian.

*Geology*
*Science News-Letter, December 21, 1929*

LES GISEMENTS DE CUIVRE DE L'OURAL, PARTIE II—A. Zavaritsky—*Geological Committee (Leningrad)*. An account of the copper deposits in the Ural region. In Russian, with summary in French.

*Geology*
*Science News-Letter, December 21, 1929*

THE CHILD: HIS NATURE AND NEEDS—*The Children's Foundation* ($1). This book, reviewed in the SCIENCE NEWS-LETTER of November 2, was not a new edition but a tenth printing of this useful work.

*Child Care*
*Science News-Letter, December 21, 1929*

MATHEMATICAL AND PHYSICAL PAPERS—Sir Joseph Larmor—*Macmillan* ($42.50). It was in 1880 that Sir Joseph began his active scientific career at Queen's University in Ireland. In 1885 he came to Cambridge as lecturer in Mathematics, and in 1903, two years after he was knighted, he became Lucasian professor there, which post he still holds. In these two bulky volumes are gathered 104 of his important papers on mathematical and physical topics. Many are on the electrical properties of ether and matter, a field in which his contributions have been great. others areon electro-dynamics and thermodynamics, and on problems of such general interest as "Why Wireless Electric Rays Can Bend Round the Earth" and "What determines the Resistance and Tilt of an Aeroplane?" In the eight appendices are several recent and unpublished papers, including one on the time and space of astronomical observers and another on "Mind, Nature and Atomism." Though the publication in such form of a scientist's collected papers might seem to carry an air of finality, one hopes that this is not the case, and that his active work may long continue.

*Physics*
*Science News-Letter, December 21, 1929*

THE MIND AND WORLD-ORDER—C. I. Lewis—*Scribner's* ($3). Prof. Lewis here undertakes to outline a theory of knowledge which will take into consideration the results of an application of the methods of exact logic in the field of mathematics.

*Philosophy*
*Science News-Letter, December 21, 1929*

A CHILD'S MAP OF THE ANCIENT WORLD—Alice York. Designed by Ilonka Karasz.—*John Day Company* ($1.50). Growing interest in the old world, and particularly the excavations at Ur and Kish, recall to us this unusual map, published several years ago. Besides arousing interest in ancient peoples, it is very decorative.

*Archæology*
*Science News-Letter, December 21, 1929*

HOW TO MAKE A CAT TRAP—James Silver—*U. S. Government Printing Office* (5c). This leaflet will be welcomed in neighborhoods infested with sleep-destroying, bird-killing stray cats.

*Zoology*
*Science News-Letter, December 21, 1929*